



## **Remedial Action Field Oversight at Sauget Area 2 (SA2) Sites, Sauget, Illinois WA No. 137-RXBF-05XX / Contract No. 68-W6-0025**

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### **Introduction**

This memorandum summarizes Remedial Action (RA) field activities associated with the Groundwater Migration Control System (GMCS) for SA2 Sites in Sauget, Illinois in July 2003. CH2M HILL provided field oversight from July 1 to July 8. The field activities consisted of completing the installation of piezometers and monitoring well, the 12-inch pipeline, electrical devices, and vaults associated with the groundwater migration control system.

CH2M HILL provided oversight for the onsite activities and routine coordination and correspondence with USEPA. Two weekly progress reports are provided in Attachment A. Photographs of representative site activities are presented in Attachment B.

### **Field Activities**

During the month of July, the following contractors were present on site at Sauget Area 2:

- Golder Associates Inc. (Golder) of Saint Charles, Missouri (contractor for oversight of groundwater extraction well, piezometer, and monitoring well installation)
- Layne-Western Inc. (Layne) of Fenton, Missouri (responsible for extraction well vault placing)
- Lowry Electric (Lowry) (contractor responsible for installation of electrical and control wiring for the pumping system)
- Philip Services Company (Philips) of Columbia, Illinois (contractor responsible for construction and installation of the 12-inch pipeline to convey extracted groundwater)
- Roberts Environmental Drilling Inc. (Roberts) of Columbia, Illinois (contractor responsible for installation and development of 12 monitoring wells and 8 piezometers at Site R)
- Rock Hill Mechanical (Rock Hill) (pipefitters for extraction well vaults)
- URS Corporation (URS) (primary consultant for Solutia)

## Extraction Wells

Layne completed the well vault placement at each of the three extraction wells by July 2, 2003. Golder Associates oversaw the vault installation on behalf of Solutia. Concrete lids were placed on top of each vault. The areas surrounding the vault and pitless adapter were backfilled.

## Startup of GMCS

The groundwater migration control system was switched on to start the extraction wells pumping on July 15, 2003. The three wells were initially pumping at a combined flow of 100,000 gallons per day (or approximately 23 gallons per minute per well). The flow rate was set low to give the American Bottoms Regional Treatment Facility (ABRTF) time to blend the new waste stream into their current process. The flow rate will be increased when ABRTF determines a higher flow rate is permissible.

## Installation of Piezometers and Monitoring Wells

Roberts completed the installation of eight piezometers and twelve monitoring wells across site R, by July 9, 2003. This work was conducted with oversight by Golder on behalf of Solutia.

Twelve monitoring wells, in clusters of three, and eight piezometers in pairs, were installed across Site R for the groundwater migration control project. The four monitoring well clusters are all located outside the proposed barrier wall, with a shallow, middle and deep well in each cluster. The monitoring wells will be used to examine the groundwater quality of each of the three hydrogeologic units. The four pairs of piezometers each contain one well inside and one well outside the proposed barrier wall location. The piezometers will be used to monitor the groundwater levels via transducers during operation of the groundwater pumping system.

### Well and Piezometer Installation

Roberts installed in July 2003 one deep monitoring well. Well **BWMW3-D** was constructed with a riser extending from approximately 3 feet above ground to 10 feet above the bottom of the well. The total depth of the well is 131.5 feet. A 10-foot screen was placed below the riser to expose the screen to the Deep Hydrogeologic Unit (DHU).

Roberts installed three piezometers in July 2003. Each of the three piezometers, **P1N**, **P3E**, and **P3W**, were drilled five feet into bedrock. The total depths of the piezometers were 132 feet, 139 feet, and 138 feet, respectively. The piezometers were constructed with riser extending from approximately 3 feet above ground to near the top of the Middle Hydrogeologic Unit (MHU) generally between 50 to 55 feet below ground surface. The screens were set from below the riser to the bottom of the well. The piezometer screens cover the formations of both the MHU and the DHU.

Both the monitoring well and piezometers were constructed of 2-inch diameter stainless steel riser and screens, with an opening of 0.010 inch (10-slot). Sand was placed directly into the borehole to cover the screened zone and an extra 2 to 3 feet, followed by a bentonite chip seal approximately 10 feet thick for the deep well and piezometers. Bentonite-cement grout was then placed from the top of the seal to ground surface.

## **Well Development**

The well development for all new wells and piezometers was completed. Three monitoring wells (**BWMW3** cluster) and three piezometers (**P1N**, **P3E** and **P3W**) were developed in July 2003.

Shallow wells were developed using a whale pump, while the middle and deep monitoring wells and piezometers with a dual-tube developer (air developer). At least three well volumes of water were removed from the wells during well development. Depths-to-water and total well depths were measured before and after development.

## **Well Completion**

Roberts finished well completion at all newly installed monitoring well and piezometer locations during July 2003. Well completion for monitoring wells consisted of installing an above ground protective well casing surrounding the well riser, placing well caps on each well, drilling weep holes, and installing bumper posts around each well or well cluster.

The eight piezometers were completed by placing concrete man-hole rings around the above-ground riser. The man-hole rings provide a temporary and moveable completion for the piezometers to allow for electrical completion of transducers for the wells.

## **Other Activities**

### **Electric Devices for Pumping System**

Lowry Electric and URS completed the installation of the electric devices for the pumping system during July 2003. Lowry connected electric and control wiring to each of the three extraction wells and their control panels. Wiring to the well pumps, transducers and flow meter at each extraction well was installed.

Transducers were installed in the four upgradient piezometers (P1S, P2E, P3E, and P4E). Control wiring from the transducers was connected to the control building. URS set up the computer-based control system inside the control building.

### **Permanent HDPE Pipeline Installation**

Philips completed the permanent HDPE pipeline installation that traverses site R and beyond to two outfalls for the ABRTF during July 2003. The pipeline consists of a 3000-foot “west-run” from the wells across Site R to the levee and a 1200-foot “east-run” from the levee to the ABRTF outfalls. The pipeline conveys the extracted groundwater from the three extraction wells to the Physical/Chemical Wastewater Treatment Facility (Pchem plant) for preliminary treatment. The pretreated groundwater is then conveyed to the ABRTF for further treatment.

The west run of the pipeline was pressure and leak tested on July 1, 2003. The test proceeded successfully without loss of pressure. The trench containing the pipeline was backfilled to ground level across the site. The iron piping at the terminus of the pipeline, which directs water flow into the ABRTF outfalls was installed with a refrigerated automatic sampling unit.

## Health and Safety

Solutia safety inspectors visited the site frequently and checked on safety issues. Sign-in and sign-out logs were required for all contractors on site. Level D personal protection equipment (PPE) such as hard hats, steel toe boots, safety glasses were donned by personnel on site, with ear protection as necessary.

Air monitoring was conducted by Golder with a PID during various activities. Some PID spikes were measured during well development, but without impact to the breathing zone of Roberts personnel.

Dust or particulates in the air were a potential concern across Site R because of the dry weather on some days. The particulates generated from the dirt roads across the site becoming airborne. Phillips, as requested by Solutia, used a water truck to wet the roads to minimize the dust generation.

## Equipment

An SQD-600 (Speedstar Quick Drill)-600 was used by Roberts for installation of the deep monitoring well and piezometers. The SQD-600 utilized a mud rotary method with a 6 ¾-inch tri-cone drill bit.

## IDW Management

The drilling mud and soil cuttings from monitoring well and piezometer installation were contained into 55-gallon drums at each well. A vacuum truck was used to transfer the drum contents into a total of four roll-off boxes staged temporarily at the northern end of the site. Purged groundwater from well development of the newly installed monitoring wells and piezometers was temporarily contained in 55-gallon drums, and subsequently emptied into the “modu-tank” located on the east side of Site R.

The modu-tank is a temporary open-top tank situated in the northeast corner of Site R with a maximum capacity of 250,000 gallons. Currently, the modutank contains a mixture of rain and extracted groundwater. It is anticipated that the water in the modu-tank, together with extracted groundwater from the pumping system, will be conveyed to the Pchem Plant and the ABRTF for treatment in the near future.

## Anticipated Work for August 2003

Solutia anticipates mobilization for the slurry wall construction will start during August 2003.

**Attachment A**  
**Weekly Reports**

## **Weekly Summary Report**

### **USEPA Oversight, Sauget Area 2, Sauget, IL**

### **WA No. 137-RXBF-05XX / Contract No. 68-W6-0025**

**Week Ending Thursday, July 3<sup>rd</sup>, 2003**

This report summarizes field oversight of Remedial Action (RA) work conducted from June 30, 2003 through July 3, 2003. The current RA fieldwork consists of completion of the extraction well vaults, continued installation of electric and control wiring for the pumping system, the 12-inch pipeline for conveying extracted groundwater, and the twelve monitoring wells and eight piezometers across Site R.

## **Contractors Onsite**

Golder Associates Inc. (well installation consultant)  
Layne-Western Inc. (extraction well contractor)  
Lowry Electric (electrical system installation contractor)  
Phillips Services Co. (pipefitters for permanent 12-inch pipeline)  
Roberts Environmental Drilling (piezometer and monitoring well installation contractor)

## **Work Performed This Week**

### **Vault Installation at Extraction Wells**

Layne-Western completed the installation of the vaults at the three extraction wells by July 2, 2003. Golder Associates directed vault installation, on behalf of Solutia. Layne placed the concrete lid of each vault in place and backfilled around the vaults and pitless adapters, though the areas where electricians and pipeline installers were working remained open. Also during the week Layne decontaminated equipment, and demobilized their backhoe and drill rig before removing off site.

### **Installation of Piezometers and Monitoring Wells**

Roberts Environmental Drilling Inc. (Roberts) continued work associated with the twelve monitoring wells and eight piezometers for the groundwater migration control system at Site R during the week. This work was conducted under the direction of Golder Associates on behalf of Solutia.

Roberts had two drill rigs on site: a CME (Central Mine Equipment)-75 rig (used to assist in piezometer installation at one well), and an SQD (Speedstar Quick Drill)-600 for deep monitoring well and piezometer installation. The CME rig drilled with a 4 ¼ -inch hollow stem auger (which makes approximately an 8-inch hole) to install steel casing to approximately 50 feet below ground surface at piezometer location P1N. (Installation of P1N is not yet complete.) The SQD-600 utilized a mud rotary method, with 6 ¾-inch tri-cone drill bit, to install the deep wells and piezometers without soil logging.

## Well and Piezometer Installation

Well installation was completed at two locations during the week using the SQD-600 rig. The two locations were monitoring well **BWMW3-D** and piezometer **P3W**, with total depths of 131.5 feet and 138 feet below ground surface respectively. The piezometer P3W was socketed five feet into rock which was found at approximately 133 feet below ground surface. (Note that at P3W at 135 feet, a hole or fracture in the rock was encountered which caused loss of drilling mud. Steel casing was installed to a depth of approximately 60 feet and the borehole re-drilled. Eventually the drilling mud was retained in the hole and the piezometer location was drilled two feet deeper to a depth of 138 feet, five feet below where rock was initially encountered.)

Monitoring well BWMW3-D was constructed with riser extending from above ground to 121 feet deep, and screen extending from 121 feet to 131 feet below ground surface. The deep monitoring wells were designed to screen the Deep Hydrogeologic Unit. Piezometer P3W was constructed with riser from 3 feet above ground to 53 feet below ground surface, the screen extended from 53 feet to 138 feet below ground surface. The piezometers were designed to expose the screen to both the Middle and Deep Hydrogeologic Units. Two-inch diameter stainless steel well riser and well screen were used for construction of all wells, the screen had a 10-slot opening (0.010-inch aperture). Wells were constructed by pouring sand directly into the borehole to cover the screened zone and an extra 2 to 3 feet, followed by a bentonite chip seal approximately 10 feet thick, and a bentonite-cement grout placed from the top of the seal to ground surface.

Note that the location of the piezometer pair, P3W and P3E, was moved from the original marked location to the south of the adjacent drainage ditch prior to drilling. The move was to accommodate a more even location of the piezometers halfway between extraction wells EW-2 and EW-3. The drilled well location was approximately 50 feet south of the logged borehole (north of drainage ditch) for piezometer location P3W.

## Well Development

Roberts continued well development of the installed monitoring wells and piezometers during the week. Three piezometers, **P4E**, **P4W** and **P1N**, and six monitoring wells, **BWMW1** cluster and **BWMW3** cluster were developed this week. Shallow wells were developed using a whale pump, while the middle and deep wells (including piezometers) using a dual-tube developer (air developer). The depth-to-water and total depths of the wells were measured prior to development. At least three well volumes of water were purged at each location during development.

Purged groundwater was temporarily staged in 55-gallon drums. The drums were subsequently emptied into the "modu-tank" located on the east side of Site R.

## Well Completion

Roberts finished well completion at monitoring well cluster location BWMW2, leaving only monitoring well BWMW3-D left to be completed. Well completion consisted of installing an above ground protective well casing surrounding the well riser, placing well caps on each well, and installing bumper posts around each well or well cluster. Weep holes will be drilled in the protective well casing surrounding each well riser next week.

Piezometers will be completed temporarily with concrete manhole rings in the next week. (A removable completion will be used to enable the installation of transducers and wiring to each of the piezometers.)

## Other Activities

- Lowry Electric continued to connect electric and control wiring at each of the three extraction wells. The control panels were hooked up, via installed conduits, to the well and conduit leading to the control building. Wiring to the well pumps, transducers, and flow meter were also installed. Control wiring was also pulled through the main conduit across site, to carry the signal from the upgradient piezometer transducers (yet to be installed) back to the control building.
- Phillips Services Company neared completion of the 12-inch permanent HDPE pipeline installation across site R and east of the levee to near the American Bottoms Regional Treatment Facility (ABRTF) during the week.

The "west run" of the 12-inch permanent HDPE pipeline was pressure and leak tested on July 1, 2003. The west run of the pipeline was approximately 3000 feet in length and runs north from extraction well EW-3 to the northern edge of site R, then east parallel to Riverview Avenue to the levee. The pipeline was pressurized to approximately 100 pounds per square inch with air and monitored for pressure loss and potential leaks. The test proceeded successfully without any recorded loss of pressure.

The east and west runs of the pipeline were connected on July 2, 2003. Backfilling the pipeline trench to ground level was approximately two-thirds completed across the site during the week. An 'air-release valve' was installed in the pipeline run on the north of site R, parallel to Riverview Avenue, on June 30, 2003.

- The Investigation Derived Waste (IDW) generated during the installation and development of the three extraction wells was estimated by CH2M HILL with the assistance of Layne during the week. The five roll-off boxes were measured and the volume of IDW estimated visually. The measurements result in the following rough estimates of IDW produced from each extraction well.

EW-1: approximately 20 cubic yards  
EW-2: approximately 10 cubic yards  
EW-3: approximately 9 cubic yards

Note that the quantity of IDW generated at each well was also estimated by Golder by totaling the measured volume of materials settled in the base of the well prior to each bailing session. The Golder estimates for IDW generated at EW-1 and EW-2 were lower, but as Golder observed, and suspended fines present in bailed water would not have been accounted for by their measurements.

## **Weekly Summary Report**

### **USEPA Oversight, Sauget Area 2, Sauget, IL**

### **WA No. 137-RXBF-05XX / Contract No. 68-W6-0025**

**Week Ending Friday, July 11<sup>th</sup>, 2003**

This report summarizes field oversight of Remedial Action (RA) work conducted from July 7, 2003 through July 11, 2003. The current RA fieldwork consists of finishing installation of twelve monitoring wells and eight piezometers across Site R, and completion of the electric, control wiring, and HDPE pipeline for the groundwater pumping system.

## **Contractors Onsite**

Golder Associates Inc. (well installation consultant)  
Lowry Electric (electrical system installation contractor)  
Phillips Services Co. (pipefitters for permanent 12-inch pipeline)  
Roberts Environmental Drilling (piezometer and monitoring well installation contractor)  
URS (primary consultant for Solutia)

## **Work Performed This Week**

### **Piezometers and Monitoring Wells Installation**

Roberts Environmental Drilling Inc. (Roberts) completed the installation of piezometers and monitoring wells associated with the groundwater migration control system at Site R on July 10, 2003. This work was conducted under the supervision of Golder Associates on behalf of Solutia.

### **Well Installation**

Two piezometers, **P3E** and **P1N**, were installed this week. This concluded the installation of the 12 monitoring wells and 8 piezometers associated with the current RA project. Both piezometer boreholes were drilled five feet into the bedrock, with a total depth of 139 feet for P3E and 139 feet for P1N, respectively.

A Speedstar Quick Drill (SQD)-600 drill rig was used to install the two piezometers. The SQD-600 utilized a mud rotary method, with a 5 7/8-inch tri-cone drill bit, to advance the boreholes without soil logging.

Two-inch diameter stainless steel well riser and well screen were used for construction of the piezometers. The well screen had a 10-slot opening (0.010-inch aperture). Piezometer P3E was constructed with riser from 3 feet above ground to 54 feet below ground surface. The well screen extended from 54 feet to 139 feet below ground surface. Similarly, piezometer P1N was constructed with a 75-foot length of screen extending from 57 to 132 feet below ground surface with riser above the screen. The piezometers were designed to expose the screens to both the Middle and Deep Hydrogeologic Units.

Wells were constructed by pouring sand directly into the borehole to cover the screened zone and an extra 2 to 3 feet, followed by a bentonite chip seal approximately 10 feet thick, and a bentonite-cement grout placed from the top of the seal to ground surface.

### Well Development

Roberts completed well development of three piezometers during the week. The piezometers, **P3E**, **P3W** and **P1N**, were developed using a dual-tube developer (air developer). The depth-to-water and total depths of the wells were measured prior to development. At least three well volumes of water were purged during development.

Purged groundwater was temporarily staged in 55-gallon drums. The drums were subsequently emptied into the "modu-tank" located on the east side of Site R.

### Well Completion

Roberts finished the well completion of monitoring well **BWMW3-D** during the week. Well completion activities consisted of installing an above ground protective well casing surrounding the well riser, placing well caps on each well, and installing bumper posts around each well or well cluster. In addition, weep holes in the protective casing of all monitoring wells were drilled this week. This concluded the completion of all monitoring wells.

Piezometer construction were completed on July 9, 2003 by placing concrete man-hole rings around the above ground riser. The man-hole rings provide a temporary and moveable completion for the piezometers to allow for electrical installation of the pressure transducers.

### Other Activities

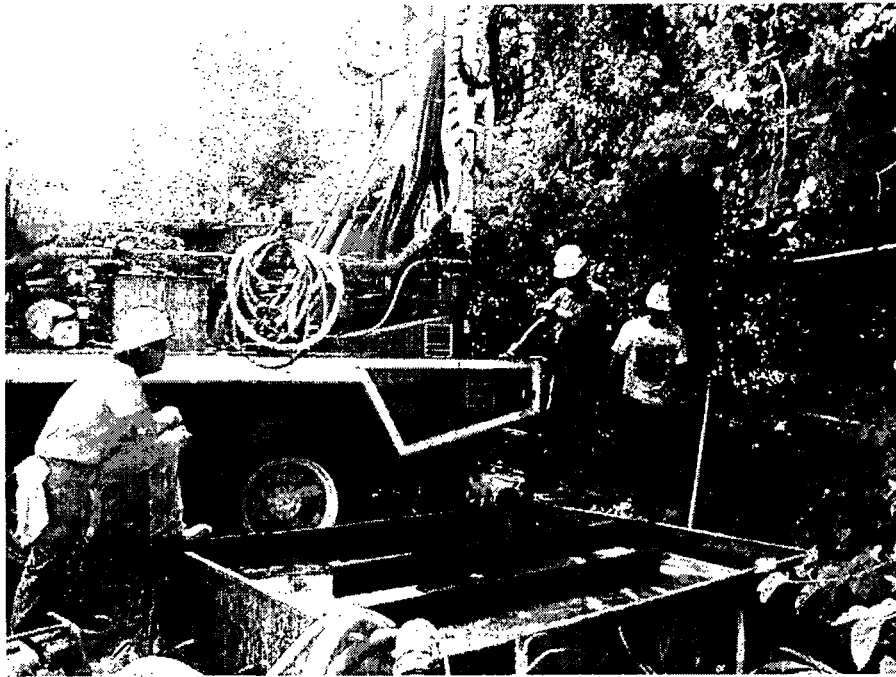
- Lowry Electric (Lowry), in coordination with URS, continued to connect electric and control wiring at each of the three extraction wells and the control building. Pressures transducers were installed in each of the four upgradient piezometers (P1S, P2E, P3E, and P4E). Control wiring from the transducers was connected to the control building.
- Phillips Services Company (Phillips) completed the permanent HDPE pipeline installation across Site R and east of the levee to near the American Bottoms Regional Treatment Facility (ABRTF) during the week. The above ground iron piping at the terminus of the HDPE pipeline, directing the groundwater flow into the ABRTF outfalls, was completed during the week the valve and automatic sampler were installed. Backfilling the pipeline trench to grade was completed across the site this week.
- Solutia observed a gully where soil was washed out on the edge of the landfill cap adjacent to extraction well EW-2 at Site R. The gully will be filled in with clay to restore grade in the coming week.

**Attachment B**  
**Photographs**

## Photographs of Site Activities – July 2003



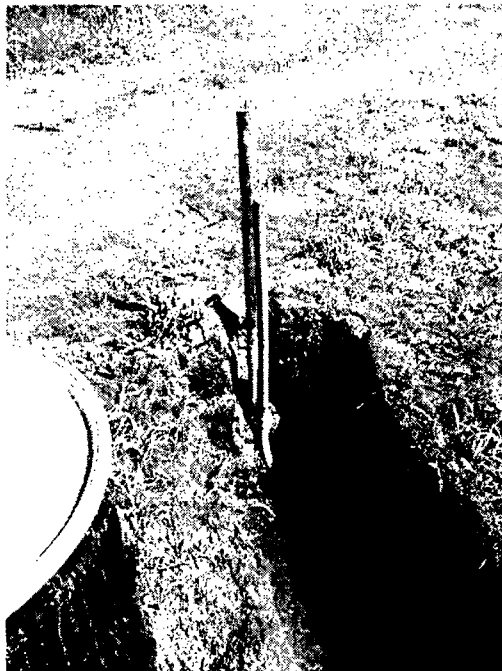
Well completion at monitoring well cluster BMW3.  
(July 1, 2003)



Drilling at piezometer location P3W.  
(July 1, 2003)



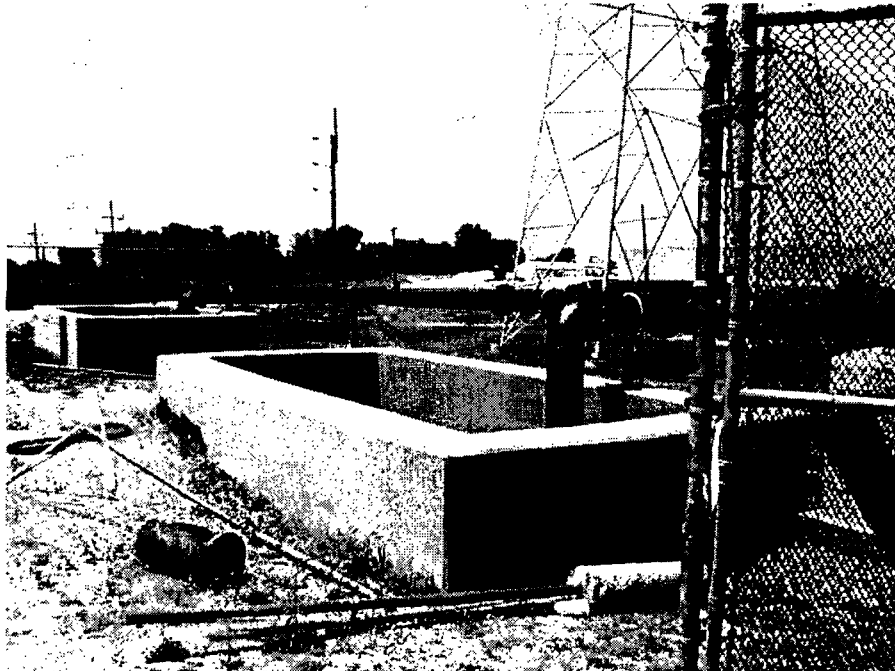
After placing lid on vault at extraction well EW-1, Layne backfilled around vault and pitless adapter.  
(July 2, 2003)



Trench to upgradient piezometer P2E, and conduit to contain control wiring for transducer.  
(July 7, 2003)



Wiring for groundwater migration control system was connected into control panels inside the control building.  
(July 7, 2003)



The above ground iron pipe connects the underground HDPE pipeline to the two American Bottom's outfalls.  
(July 8, 2003)